

Preventing Worker Injuries and Deaths from Explosions in Industrial Ethylene Oxide Sterilization Facilities

ATTENTION WORKERS!

Explosions may result from improper venting of ethylene oxide into oxidizing emission control devices (OECs).

Workers should take the following steps to protect themselves while working in ethylene oxide (EtO) sterilization facilities:

Prevent overfeeding of the OEC

- Make sure that all interlocks and other safeguards are in place before sterilization begins.
- Periodically wash or vent sterilized products that sit idle in a sterilizer or aeration room to prevent EtO buildup.
- Monitor EtO concentrations in the sterilizer before the back vents are activated to avoid venting high EtO concentrations to the oxidizing emission control device (OEC).
- Vent confined spaces such as the sterilizer and the aeration room to the outside after a power loss.
- Do not purge EtO lines to an OEC.
- Perform regular preventive maintenance.
- Obtain management approval before changing the process or safety interlocks.

Store and handle EtO properly

- Store EtO in tightly closed cylinders or tanks in a cool, shaded, well-ventilated, explosion-proof area.
- Do not smoke at work.
- Do not use electrical devices or create open flames where EtO is handled, used, or stored.

- Use nonsparking tools when opening or closing metal containers of EtO or whenever EtO might be present.
- Keep containers individually bonded and grounded to the earth when liquid EtO is poured or transferred.

Deal with leaks and spills

- Leave a leak or spill area immediately.
- If a catastrophic or large release of EtO occurs, do not enter the area. Evacuate the building and notify the fire department immediately.
- Do not enter an area where there is a small EtO leak until you have put on personal protective equipment (PPE), including a self-contained breathing apparatus (SCBA) that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
- **Do not use an SCBA unless you have received proper training and are current on its safe use.**

Be prepared for rescue

- Know emergency rescue steps and where emergency equipment is located.
- **Do not participate in emergency response without an SCBA and proper training.** If you do not have an SCBA and proper training, let the local fire department conduct the rescue.
- Before rescuing anyone in a leak or spill area, notify another person and put on an SCBA. Do not use a canister-type respirator for emergency response.

- If someone stops breathing because of EtO inhalation, immediately remove the person from the exposure area and perform cardiopulmonary resuscitation (CPR) while someone else calls for medical help. Keep the victim warm.

Prevent skin and eye contact

- If liquid EtO contacts your skin, rinse it immediately under a heavy shower. Remove any contaminated clothing. Get medical attention.
- If EtO gets into your eyes, flush them immediately with a steady stream of water for at least 15 minutes. Lift the upper and lower eyelids and direct the stream of water under the eyelids. Get medical attention.

- Do not wear contact lenses in an area where EtO exposure might occur.

Use respiratory protection and other PPE

- Use the respiratory protection recommended in the complete Alert during emergencies, maintenance work, vessel cleaning, and whenever engineering controls cannot be implemented. (See ordering information for the Alert at the bottom of this sheet.)
- Use PPE such as chemical-resistant gloves, eye-splash protection, and liquid-tight protective clothing whenever liquid EtO might be present.

For additional information, see ***NIOSH Alert: Preventing Worker Injuries and Deaths from Explosions in Industrial Ethylene Oxide Sterilization Facilities*** [DHHS (NIOSH) Publication No. 2000-119]. Single copies of the Alert are available free from the following:

NIOSH—Publications Dissemination
4676 Columbia Parkway
Cincinnati, OH 45226-1998

Telephone: 1-800-35-NIOSH (1-800-356-4674)
Fax: 513-533-8573
E-mail: pubstaft@cdc.gov

or visit the NIOSH Web site at www.cdc.gov/niosh

U.S. Department of Health and Human Services
Public Health Service
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health